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Collaborative Research in Economics in Pakistan: The Case of Pakistan Development Review from 1973 to 2009

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ABSTRACT

The pattern of collaborative authorship (extent of international collaboration and degree of collaboration) and institutional affiliation in the papers of the *Pakistan Development Review* were determined by using bibliometric techniques. The sample used was the papers published during 1973-2009. Of the 1627 papers, 723 (44.44%) were the result of collaborative effort. International collaboration was observed only in 94 papers. The degree of collaboration was 0.44 as a whole and the year-wise calculated degree ranged between 0.13 and 0.76. The year 2009 was the most productive year in terms of collaborative research.

Keywords: *Pakistan Development Review*; Economics; Pakistan; Bibliometrics; Collaborative authorship

INTRODUCTION

Collaborative research is that which is carried out by a group or groups which involve the ideas/mental and physical efforts of two or more individuals. There is no clear indication as to when collaboration in research started. Of the many writers who have written on this topic, the work of Price (1963) is considered very valuable. Using

Chemical Abstracts and the increasing trend of collaboration in the field of chemistry, he anticipated that by 1980 the single-authored papers will become extinct. Bruffee (1973) presented the argument that scholars working in groups produce better work than when they produce alone. The work of these two scholars can be regarded as catalyst on the production of collaborative research as well as in catching attention of bibliometricians. Presently collaborative authorship, especially in the pure and applied sciences, is observed as a very common trend and it is interesting that collaboration is taking place irrespective of geographical boundaries.

Collaboration in research helps in the productivity of papers; clarification of ideas; enhancing quality of research; division of labour; helping younger colleagues in gaining experience; exploration of new areas/topics; and in getting benefits of lengthy copyright period. The present study was carried out to identify collaborative trends in economics in Pakistan. However, the study is limited to the papers published in *Pakistan Development Review (PDR)* during the period 1973-2009.

PDR, an international economics journal, started publication in 1958 as the *Economic Digest* by the Pakistan Institute of Development Economics (PIDE) which is one of the oldest specialized institutions in the discipline of economics in Pakistan. It has been publishing regularly since 1961 with a short pause during 1971-1972. It contains theoretical and empirical contributions with a main focus on Pakistan's socio-economic problems. The contents of *PDR* are abstracted / indexed in international databases, for example, Econlit, World Agricultural Economics, International Bibliography of the Social Sciences, and Rural Sociology Abstracts (PIDE, 2010). Thus, being an important

journal of economics from Pakistan, it is targeted to determine the collaborative research trends in Pakistan using the papers published during 37 years, 1973 to 2009.

LITERATURE REVIEW

A number of studies have been conducted on the analysis of collaborative research in different disciplines. Some of these studies are reviewed here.

Vimala and Reddy (1996), who analyzed the doctoral theses in the field of zoology, concluded that multiple-authorship was dominant, and the degree of collaboration was 0.75 as a whole. They observed that the trend of solo-writing declined during 1901-1995 and anticipated that the proportion of single authorship was likely to be insignificant after the year 2030. Nwagwu (2007) studied the patterns of authorship in the biomedical literature of Nigeria using a total of 6820 papers published during the period 1967-2002 derived from MEDLINE. He found that 77 percent of the papers had multiple authors while only 23 percent of the papers had single authors. On an average, there were 3.44 authors per paper with a collaborative coefficient of 0.644.

Pillai (2007) conducted a study of 11,412 journal and 1,328 book citations in physics for the determination of trends in authorship pattern and collaborative research using the data collected from the doctoral dissertations of the Indian Institute of Science. It was found that joint authorship was a preferred pattern and on average the degree of collaboration in journals was 0.08. Pradhan, Panda, and Chandrakar (2011) studied the trends in authorship and collaborative patterns in Indian chemistry literature using 53,977 articles published during the period 2000-2009 derived from the ISI Web of Science. The average number of authors per article was 3.55. They found that only 3.03 percent of the

articles were single-authored and 96.97 percent multi-authored with the highest percentage going to three-authored articles. The degree of collaboration during the period was 0.03.

Rana and Agarwal (1994) studied the authorship and collaborative research patterns in Indian wildlife and fisheries based on data collected from *Wildlife Review and Fish Review* published from 1980 to 1989. It was found that the proportion of single-authored papers had decreased from 63.68 percent in 1980 to 52.74 percent in 1989. Similarly, an increase was observed in the average number of authors per paper from 1.57 in 1980 to 1.70 in 1989 which resulted in the increase of the degree of collaboration from 0.36 to 0.47.

The co-authorship and sub-authorship collaboration was examined in the journal literature of Psychology and Philosophy by Cronin, Shaw and Berre (2003). They found that out of 2,707 articles, published in 2001, 74 percent were single-authored. Zafrunnisha and Reddy (2009) examined the degree of collaboration in the field of psychology using 141 Ph. D. theses. The multi-authored papers were dominant and the degree of collaboration was 0.53.

Park (2006) studied the authorship characteristics of the Asian and Pacific region using top 20 journals in the field of Library and Information Science from 1967 to 2005. It was found that collaborative authorship was strong in information science journals in which regional collaboration was strong between Australia and China. In the library science journals single-authored and multi-authored articles were about equally represented. Nandi and Bandyopadhyay (2008) analyzed 68 papers published during the period 1998-2002 in the *Indian Economic Review*. They found that the majority of the

papers (n=45, 66.17%) were single-authored and 23 (33.82%) were multiple-authored and the degree of collaboration had gradually decreased.

On the basis of literature reviewed above, it is safe to say that the researchers usually work jointly in sciences whereas there is a mixed trend of authorship in social sciences where single-authored papers are dominant. No such study seems to have been conducted to determine the authorship trends in economics literature in Pakistan.

OBJECTIVES AND METHOD

This study was designed to achieve the following objectives:

1. To determine the patterns of collaborative authorship in the multi-authored papers of *PDR*
2. To identify the prolific authors in these multi-authored papers
3. To find out the extent of international collaboration
4. To determine the degree of collaboration
5. To determine the frequency of institutional occurrences in the collaborative papers
6. To identify the topical coverage of the multi-authored papers of *PDR*

The bibliometric techniques of analysis were used in achieving the above objectives. A total of 1627 papers published during 1973-2009 were examined, out of which 723 (44.44%) were the result of collaborative effort. The articles with authors having foreign addresses were regarded as the result of international collaboration. The

degree of collaboration was calculated by using Subramanyam (1983) formula which is C = Nm/(Ns + Nm). In this formula "C" stands for degree of collaboration, "Ns" stands for total single-authored and "Nm" for total multi-authored articles.

$$\text{Degree of collaboration } C = \frac{Nm}{Ns + Nm} = \frac{723}{904 + 723} = 0.44$$

FINDINGS AND DISCUSSION

Patterns of collaborative authorship: Table 1 presents the patterns of research collaboration in the papers of *PDR*. Out of the 723 collaborative articles, two-authored accounted for 522 (72.20%) and three-authored 172 (23.79%). There are 25 (3.46%) four-authored and only three (0.41%) five-authored articles. Papers by seven and eight authors appeared only once. These 723 papers were produced by 1688 authors with an average of 2.33 authors per paper. On the other hand, 1627 papers were produced by 2593 authors with an average of 1.59 authors per article which was not very high.

The year-wise percentage of collaboration shows that the year 1973 received less collaboration which increased in the next publication years. In the 37 years, maximum collaborative works appeared in the periods 1998-2000 and 2006-2009. The trend of solo writing is similar to the one found by Nandi and Bandyopadhyay (2008) and Sudhier and Abhila (2011) where single-authored articles were in majority.

Table 1, Patterns of collaborative authorship

Year	Articles with Number of Authors						T. A	T. Au	Avg. au(s)/A	% of Collaborative Articles out of 1627
	2A	3A	4A	5A	7A	8A				
1973	---	03	---	---	---	---	3	9	3	.18
1974	09	---	---	---	---	---	9	18	2	.55
1975	05	01	---	---	---	---	6	13	2.17	.37
1976	04	05	---	---	---	---	9	23	2.55	.55
1977	04	---	---	01	---	---	5	13	2.6	.31
1978	06	---	---	---	---	---	6	12	2	.37
1979	04	02	---	---	---	---	6	14	2.33	.37
1980	04	---	---	---	---	---	4	8	2	.25
1981	03	01	---	---	---	---	4	9	2.25	.25
1982	04	---	---	---	---	---	4	8	2	.25
1983	04	---	---	---	---	---	4	8	2	.25
1984	06	03	01	---	---	---	10	25	2.5	.61
1985	15	03	---	---	---	---	18	39	2.17	1.11
1986	13	02	---	---	---	---	15	32	2.13	.92
1987	16	02	01	---	---	---	19	42	2.21	1.17
1988	21	07	---	---	---	---	28	63	2.25	1.72
1989	18	03	01	---	---	---	22	49	2.23	1.35
1990	05	---	---	---	---	---	5	10	2	.31
1991	21	02	---	---	---	---	23	48	2.09	1.41
1992	19	03	---	---	---	---	22	47	2.14	1.35
1993	24	08	01	---	---	---	33	76	2.3	2.03
1994	22	07	---	---	---	---	29	65	2.24	1.78
1995	17	06	02	---	---	---	25	60	2.4	1.54
1996	09	06	02	---	---	---	17	44	2.59	1.04
1997	14	03	---	---	---	---	17	37	2.18	1.04
1998	26	06	01	---	---	---	33	74	2.24	2.03
1999	22	11	01	---	---	---	34	81	2.38	2.09
2000	26	08	---	---	---	---	34	76	2.24	2.09
2001	17	08	---	---	---	---	25	58	2.32	1.54
2002	15	05	03	---	---	---	23	57	2.48	1.41
2003	15	07	01	---	---	---	23	55	2.39	1.41
2004	15	07	---	---	---	---	22	51	2.32	1.35
2005	15	09	03	01	---	---	28	74	2.64	1.72
2006	32	10	02	01	01	---	46	114	2.48	2.83
2007	25	16	01	---	---	---	42	102	2.43	2.58
2008	18	08	03	---	---	---	29	72	2.48	1.78
2009	28	10	02	---	---	01	41	102	2.49	2.52
Total	521	172	25	03	01	01	723	1688	2.34*	44.44

Table Key: 1A= I Authored Papers, 2A= 2 Authored and so on, TA= Total Articles, T. Au= Total Authors, Avg. au(s)/A= Average author / article.

*. This figure represents average number of authors per article during the period (1973-2009).

Prolific Authors: Prolific authors are those who contributed 10 or more articles in collaboration with other researchers. Table 2 shows the names of those authors in which M. Ghaffar Chaudhry is the leading contributor with 20 articles, followed by Rehana Siddiqui, Sohail Jehangir Malik and Musleh-uddin with 17 articles each. The third position is occupied by Mohammad Afzal and Ejaz Ghani with 16 articles each. A total of 29 authors contributed 10 or more articles each in which there are seven authors who contributed 11 articles each and five authors who contributed 10 articles each.

Table 2, Prolific authors in collaborative works

Rank	Author	No. of Papers	Rank	Author	No. of Papers
1	M. Ghaffar Chaudhry	20	6	Shahnaz Kazi	12
2	Rehana Siddiqui	17	6	Hafiz A. Pasha	12
2	Sohail Jehangir Malik	17	7	Mohammad Irfan	11
2	Musleh-uddin	17	7	M. Aynul Hasan	11
3	Mohammad Afzal	16	7	Kalbe Abbas	11
3	Ejaz Ghani	16	7	Ather Maqsood	11
4	Sarfraz Khan Qureshi	14	7	Shamim A. Sahibzada	11
4	Abdul Qayyum	14	7	Toseef Azid	11
4	Eatzaz Ahmad	14	7	Fazal Husain	11
5	Zeba Ayesha Sathar	13	8	Syed Mubashir Ali	10
5	Munir Ahmad	13	8	Mir Annice Mahmood	10
5	Qazi Masood Ahmad	13	8	Rizwana Siddiqui	10
6	Ashfaque H. Khan	12	8	Attiya Yasmeen Javid	10
6	Ghulam Mohammad Arif	12	8	Muhammad Iqbal	10
6	Naushin Mahmood	12	---	---	---

International collaboration: The international collaboration, based on the authors' addresses, identified only 94 (13.00%) of 723 articles (Table 3). A strong collaboration was observed between Pakistan and USA with 21 (22.34%) of the 94 collaborative works. The volume of collaboration between Pakistan and Canada, Pakistan and UK, and Pakistan and Australia was 19 (20.21%), 9 (9.57%), and 5 (5.32%) respectively. Pakistan and Holland, and Canada and USA are found collaborating in 4 (4.26%) and 3 (3.19%) articles respectively. And Turkey and UK, Japan and USA, and Pakistan and Malaysia collaborated in two (2.13%) articles each. There is only one-time

collaboration between different countries in 28 (29.79%) articles. The host country, Pakistan, appears in 79 (84.04%) out of 94 articles. This is an indication that either the research of the Pakistani authors is regarded of quality, and, therefore, attractive to the authors outside the host country, or as the focus of the journal is on the local issues the local authors can be beneficial to international authors.

International collaboration in a journal shows the scope as well as the popularity of the journal in the international community of scholars. Thus it creates an attraction for the foreign authors to collaborate with the local authors. International collaboration can also help in solving local as well as international problems. Therefore, it is a very healthy phenomenon in *PDR* and beneficial for solving local economic and social issues in international perspectives.

Table 3, International collaboration in the *PDR* papers (*N* = 94)

Rank	Countries	Frequency	%	Rank	Countries	Frequency	%
1	Pakistan and USA	21	22.34	8	Pakistan and Yemen	1	1.06
2	Pakistan and Canada	19	20.21	8	USA and UK	1	1.06
3	Pakistan and UK	9	9.57	8	Pakistan and Saudi Arabia	1	1.06
4	Pakistan and Australia	5	5.32	8	Philippines and Bangladesh	1	1.06
5	Pakistan and Holland	4	4.26	8	Pakistan, Canada and Turkey	1	1.06
6	Canada and USA	3	3.19	8	Germany and Holland	1	1.06
7	Turkey and UK	2	2.13	8	Pakistan and Taiwan	1	1.06
7	Japan and USA	2	2.13	8	Pakistan, USA and UK	1	1.06
7	Pakistan and Malaysia	2	2.13	8	Pakistan, USA and Canada	1	1.06
8	Singapore and USA	1	1.06	8	Pakistan and Germany	1	1.06
8	Pakistan, Sri Lanka and Australia	1	1.06	8	Pakistan and U.A.E	1	1.06
8	India and Switzerland	1	1.06	8	Pakistan and Thailand	1	1.06
8	Pakistan and Philippines	1	1.06	8	Italy and Chile	1	1.06
8	Pakistan and Turkey	1	1.06	8	Pakistan and Japan	1	1.06
8	Pakistan and Scotland	1	1.06	8	Pakistan and Austria	1	1.06
8	Pakistan and Singapore	1	1.06	8	Germany and Taiwan	1	1.06
8	Pakistan and Kuwait	1	1.06	8	Pakistan and France	1	1.06
8	Pakistan and Switzerland	1	1.06	8	Taiwan and Philippine	1	1.06
Total	---	---	---	---	---	94	100

Degree of collaboration: The extent of collaboration can be understood by using the formula for the degree of collaboration developed by Subramanyam (1983) as provided in the method section above. The degree of collaboration (C) for 723 papers is 0.44. This value shows that for the entire 37 years of the journal the collaboration was neither very low nor very high. Table 4 provides details when the formula is applied on the year-wise data. The degree of collaboration ranged between 0.13 and 0.76. The data show ups and downs in collaboration. However, a general increase in (C) is observed which is very sharp in 2009. This trend is against the result of Nandi and Bandyopadhyay (2008) who found that the degree of collaboration was decreasing in the *Indian Economic Review*. Thus, on the basis of the observed authorship patterns in Table 1 and the calculated (C) values, we can expect the dominancy of multi-authored articles in the coming years in the papers of *PDR*.

Table 4, Year-wise Degree of Collaboration

Year	Ns	Nm	(C)	Year	Ns	Nm	(C)
1973	20	3	.13	1992	46	22	.33
1974	16	9	.36				
1975	15	6	.29	1993	44	33	.43
1976	9	9	.5	1994	44	29	.40
9177	16	5	.24	1995	41	25	.38
1978	21	6	.23	1996	39	17	.31
1979	14	6	.3	1997	22	17	.44
1980	15	4	.21	1998	38	33	.47
1981	14	4	.23	1999	27	34	.56
1982	10	4	.29	2000	27	34	.56
1983	10	4	.29	2001	34	25	.43
1984	18	10	.36	2002	25	23	.48
1985	17	18	.52	2003	27	23	.46
1986	25	15	.38	2004	24	22	.48
1987	25	19	.44	2005	26	28	.52
1988	27	28	.51	2006	28	46	.63
1989	34	22	.392	2007	25	42	.63
1990	9	5	.36	2008	20	29	.59
1991	39	23	.37	2009	13	41	.76

Institutional affiliation of the collaborating authors: A total of 394 institutions had 1957 occurrences in both single-authored and multi-authored papers. Table 5 provides the list of those institutions having occurrences in ten or more collaborative papers. PIDE, the host institution of the journal, ranked first with 340 occurrences, followed by the University of Karachi, Quaid-e-Azam University, and Social Policy and Development Centre with 80, 48, and 18 occurrences respectively.

The table reveals that in the top 14 ranked institutions there are nine Pakistani and five foreign/international institutions. It shows that *PDR* is an attractive source for the foreign scholars to publish in.

Table 5, Institutional occurrences in collaborative papers

S. No.	Name of the Institution	Frequency of Occurrence	Rank
1	Pakistan Institute of Development Economics	340	1
2	University of Karachi	80	2
3	Quaide-e-Azam university	48	3
4	Social Policy and Development Centre	18	4
5	International Food Policy Research Institute	16	5
6	Pakistan Agricultural Research Council	16	5
7	World Bank	15	6
8	International Islamic University, Pakistan	14	7
9	Erasmus University	14	7
10	State Bank of Pakistan	14	7
11	Bahauddin Zakariya University	14	7
12	University of Agriculture, Faisalabad	13	8
13	International Monetary Fund (IMF)	11	9
14	Acadia University	10	10

Subject distribution of collaborative articles: The subject of the papers was decided on the basis of the lists published with each volume of the journal. These lists used very specific subject headings which would have made the number of topics too many. Therefore, closely related subjects were grouped together resulting in 38 major headings as listed in Table 6. There were 27 papers that did not fit into these 38 and were, therefore, placed under ‘other’.

The subject of "Agriculture and Natural Resource Mobilization; Food Protection; Irrigation; Land Reforms and Fertilizers" is very popular among the researchers with 129 (17.84%) articles. "Population; Demography; Family Planning; Fertility; Gender Issues and Behaviour" is the second most interesting area for the researchers with 78 (10.79%) articles which is followed by "Poverty; Welfare Theory; Inequalities" with 38 (5.26%) articles. The six subject categories falling in rank 20 are the less targeted areas for the researchers in joint research projects. These research trends are different than those in the Asian tigers (Hong Kong, Indonesia, Malaysia, Singapore, South Korea, Taiwan and Thailand) where "Financial Economics" and "International Economics" are the main areas of research. However, "Financial Economics", "Industrial Organization", and "Agricultural and Natural Resource Economics" are the top three fields of study for at least one of the South Asian countries (Davis & Gonzalez, 2003).

Table 6, Subject distribution of collaborative articles

Rank	Subject Category	Frequency	%
1	Agriculture and Natural Resource Mobilization; Food Protection; Irrigation; Land Reforms and Fertilizers	129	17.84
2	Population; Demography; Family Planning; Fertility; Gender Issues and Behaviour	78	10.79
3	Poverty; Welfare Theory; Inequalities	38	5.26
4	Labour and Labour wages, Worker behaviour, and Skill development	35	4.84
5	Economic Fluctuation; Economic Development; Economic Growth; Developing Planning and Policy; Developing Theory and Models	34	4.70
6	Consumption; Consumer Behaviour; Employment; Investment; Savings	33	4.57
7	Monetary and Fiscal Theory/Economics; Interest rates	30	4.15
7	Trade; Export; Import; Commercial policy	30	4.15
8	Industry, Firms	23	3.18
8	Inflation/Deflation; Price Mechanism	23	3.18
9	Financial Institutions; Institutional Economics	22	3.04
10	Education; Schooling	17	2.35
11	Exchange Rates; International Financing; Stock Markets	16	2.21
11	Health	16	2.21
11	International Economics; International Business; Balance of Payments	16	2.21
12	Financial Markets; Financial Economics	15	2.07
13	Energy	13	1.80
14	Country Studies	12	1.66
15	Income Distribution; Income Inequalities	10	1.38
15	Political Economy; Political Process, Govt. and Governance Issues	10	1.38

Table 6. Conti…

15	Regional Economics; Rural and Urban Economics; Rural Development	10	1.38
15	Taxation; Subsidies and Revenues	10	1.38
16	Banks and Banking System, Money	8	1.11
16	Human Capital; Human Resource Development	8	1.11
16	Migration/Labour mobility	8	1.11
17	Macroeconomics	6	0.83
17	Technological Change; Technology Transfer	6	0.83
18	Money Supply; Money Credit; and Money Multiply; Interest	5	0.69
18	Social Development and Social Change	5	0.69
19	Econometric Models; Mathematical Methods and Models	4	0.55
19	International Lending; Debt Problems	4	0.55
19	Telecommunication; Transport and Communication	4	0.55
20	Administration, Civil Services	3	0.42
20	Economic Theory and Economic Thought	3	0.42
20	Environmental Economics	3	0.42
20	Information Technology; E-Commerce	3	0.42
20	Islamic Economics	3	0.42
20	National Budget	3	0.42
N/A	Other	27	3.74
Total	---	723	100

LIMITATIONS OF THE STUDY

One of the limitations is the gap in literature created by the unpublished third issue of volume 47. Another limitation was the unavailability of institutional affiliations of three authors.

CONCLUSIONS

The results of the present study confirm the results of earlier studies that the social scientists usually prefer to work alone. However, an increasing trend of collaboration among Pakistani economists was observed from 2005 to 2009 suggesting that multi-authored works were growing which was a good sign for the development of the field. The concerned authorities in Pakistan need to look at this phenomenon seriously and create research environment where team-work is encouraged. This will help developing more collaborative research on the pattern of pure and applied sciences.

International collaboration in the *PDR* papers is low. Such cooperation is helpful for benefiting from the experiences of other countries. Therefore, Pakistani researchers should be encouraged to get involved in international scholarly organizations and develop relations with research scholars world-wide. It is reasonable to assume that the researchers from the developed countries will have an interest in the economic and social issues of Pakistan. Collaboration with international researchers and their institutions will enhance the research ability of Pakistani authors and will improve the quality of research.

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